

XXV.—*Contributions to the Study of the Littoral Fauna of the Anglo-Norman Islands (Jersey, Guernsey, Herm, and Sark).* By Dr. R. KÖHLER\*.

[Plate XI.]

THE Anglo-Norman islands (Channel Islands) are situated a few leagues from the French coast, to the west of the peninsula of the Cotentin. The most important of these are Guernsey, Jersey, and Alderney (Aurigny), to which may be added three smaller islands, situated not far from Guernsey—Sark, Herm, and Jethou, the Ecrehous to the east of Jersey, and a number of small islets grouped around Guernsey and which are inhabited.

I have passed two successive summers, in 1884 and 1885, in the Channel Islands. The first year I resided in Jersey and studied the fauna of that island, and, to a less extent, that of Guernsey and Sark. The following year I took up my abode in Guernsey, to continue the investigations which had only been sketched out the preceding year and to thoroughly explore Herm, which I was unable to visit in 1884.

The observations of which I shall give an account in this memoir are chiefly the result of researches carried on upon the shores at low water. During my first sojourn in the English islands in 1884 I made several dredgings and pelagic fishings, but in 1885 I preferred to devote all my time to researches on the shore; moreover I was unable to find in Guernsey a fisherman who possessed a dredge fulfilling my requirements. I have, however, carefully noted some species brought to me by the fishermen, which were obtained by dredgings made off the south-east point of Guernsey.

I did not wish (and indeed it would have been impossible for me) to pay attention to all the groups of animals which together constitute the marine fauna of Jersey. In the first place I discarded the fishes. Their study, and especially their preservation, necessitate a quantity of encumbering materials with which I could not think of loading myself. I have also paid comparatively little attention to the Mollusca. A list of the species found at Jersey has been published by M. Duprey in two notes inserted in the 'Annals and Magazine of Natural History.' I therefore omitted entirely the study of the Mollusca of Jersey, judging that I should not find anything to do after the researches of M. Duprey, who has for a very

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long time paid attention to those animals. But at Guernsey and Herm I shall indicate some interesting species which have not yet been found at Jersey.

In this memoir, therefore, I evidently cannot pretend to present an exact and complete picture of the fauna of the Anglo-Norman islands. But I have determined to publish these observations, incomplete as they may be—in the first place, because no one has ever made known the fauna of these islands in a satisfactory manner (the only list of animals which has been published is in the work of Ansted and Latham, and is too fanciful (*fantaisiste*) to be of any use to zoologists), and, secondly, because works upon local faunas are rather rare, especially in France, in consequence of which we know the fauna of our coasts on the Channel and the Atlantic only in a very imperfect manner. Works of this kind, when they are isolated, evidently possess only a purely local interest; but a collection of works treating of the fauna of distinct regions, and in which one can compare, on the one hand, the list of the animals found at a given point, and, on the other, the nature of the ground, the geological constitution of the soil, the marine currents, the temperature, and in general all the factors which influence the geographical distribution of animals, such a collection of works would possess great interest. It is to be hoped that now, when all the young zoologists make a point of going to work on the sea-coasts, our shores of the Channel and Atlantic will by degrees be explored in detail. Every one must see the interest attaching to these works of pure zoology, and they are now of absolute necessity.

Before commencing the exposition of the fauna of the Channel Islands I have an important remark to make. As may be seen by running through the list of species which I have collected during my travels, the fauna of these islands includes a great number of distinct forms. But it has seemed to me that, while the species are pretty numerous, on the other hand the representatives of any given species are much less so, and as regards the *number of specimens* the fauna is comparatively poor. There are evidently a certain number of species which are common everywhere and which must not be taken into account when we wish to take a general view of the fauna of a locality. Of course I except certain exceptionally rich stations, where the species are very varied and represented by numerous individuals, as in the caves of Sark and the shell-sand of Herm\*.

\* I was fortunate enough to meet at Jersey a man who has occupied himself for several years with the study of marine animals—Mr. Sinel,

## JERSEY.

The island of Jersey, situated at a distance of  $12\frac{1}{2}$  miles from Portbail, has the form of a parallelogram with its borders irregular and pretty deeply cut. Its greatest length, from the south-eastern extremity to the north-east point, that is to say from the Pointe de la Rocque to Cape Gros-Nez, is 12 miles, from Corbières Point to the Pointe de la Coupe, which are the extremities of the other diagonal, the distance is a little less. Its width varies between  $4\frac{1}{2}$  and  $6\frac{1}{4}$  miles, the island being wider at the two extremities than in the middle, where it is deeply excavated by St. Aubin's Bay.

The island of Jersey slopes from the north to the south and south-east. The northern region in fact attains an elevation of 200–270 feet above the level of the sea, and in proportion as we depart from the north coast to descend towards the south we find the altitude regularly diminish, especially in the southern and south-eastern regions, where the ground, which is not much elevated, is continuous with the extensive sands of the bays of St. Aubin, St. Clement, and Grouville, whilst to the south-west the coast is more elevated and forms some escarpments between Sainte-Brelade and Corbières Point.

The island of Jersey is composed of very various ancient rocks, the study of which is of much interest, and which are known to us thanks to an already old memoir by Transon\* and especially to a very recent paper by M. de Lapparent †. "The most ancient stratified rock in the island," says M. de Lapparent, "is a schistose grauwacke, often very hard, which occupies the central part of Jersey, and which is surrounded by three *massifs* of a granitic rock which authors have called syenite. This rock, composed of reddish felspar, vitreous quartz, and partially decomposed greenish mica, often becomes

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who has established a natural-history repository at St. Helier, and knows the shores of the island very well; he has given me valuable information which has certainly saved me a very considerable loss of time. I am very grateful to Mr. Sinel for the indications he gave me, thanks to which my investigations were rendered easier, since I was able to profit by the experience which he has been acquiring for several years; the remarks which I have been able to make upon the absence, the presence, and the distribution of certain species thus acquire a greater value than if I had been left entirely to my own resources.

\* "Description géologique de l'île de Jersey," in *Annales des Mines*, 4<sup>e</sup> série, tome xx. p. 501.

† "Notes sur les roches éruptives de Jersey," in *Bull. Soc. Géol. Fr.* 3<sup>e</sup> série, tome xii. p. 284.

porphyroidal by the development of large crystals of orthose. A remarkable fact is the tendency of the quartz to acquire a granulitic appearance. From this result *massifs* or veins of a granulite with very black and rather scarce mica, the most distinct exposure of which is that observed near Mont Mado, in the form of a band accompanied by quartzose veins with sulphide of molybdenum." At those points where the syenite does not come to the surface it is covered either by *diluvium*, as in the greater part of the centre of the island, or by argillaceous schists, as in the region of St. Aubin's Bay, or again by petro-siliceous porphyries, conglomerates, and melaphyres, as is the case in the north and north-east of the island.

St. Helier, the capital of the island, situated in the valley of St. Sauveur, extends in a westerly direction along the most eastern region of St. Aubin's Bay, and terminates towards the south and east against a steep ridge about 160 feet high, called Town Hill. Starting from Town Hill the coast, which is quite low, runs at first towards the east and then bends a little towards the south as far as the Witches rock; it then resumes its easterly direction as far as the Pointe de la Rocque, presenting a shallow but very wide concavity which forms St. Clement's Bay. Throughout this space between Town Hill and the Pointe de la Rocque the coast is lowest; here the retiring sea lays bare an immense extent of sands bestrewn with rocks and becoming wider as we approach La Rocque, the whole of which forms the Banc de Violet. The different regions of these sands and rocks have received special names. First comes the Havre des Pas, commencing at Town Hill and bounded on the west by a series of rocks facing Elizabeth Castle, from which they are separated by a deep gulf; the most advanced of these rocks is the Dog-Nest. It is in the Havre des Pas that very large specimens of *Carcinus maenas* are often taken, whence the name of "Crabière" given by the inhabitants to this portion of the coast. This station is pretty rich; a very rare crustacean, *Acheus Cranchii*, Leach, is found in it.

Following the Havre des Pas comes the Grève d'Azette, sprinkled with rocks, the most important of which form the masses called La Ronde and Le Croc, near the coast, the Rocher-blanc and the Sambue, situated at the limit of the lowest tides, and lastly La Mothe, which separates the Grève d'Azette from St. Clement's Bay.

The Grève d'Azette, with the vast extent of ground which is uncovered to the south-east of La Rocque, is the richest station in the island. The sea in retiring forms numerous shallow pools, presenting a strong vegetation of *Zostera* and

surrounded by rocks clothed with an abundant covering of Algæ, often enclosing small natural grottos, which give shelter to interesting animals. At certain points, where the ground is sloping, little streams are produced, carrying off the excess of water from the higher parts, and it is in these streams that we can make the best collections of Bryozoa, Compound Ascidia, Hydroids, and some kinds of Sponges; near the banks the current is less rapid, and interesting Annelides may be collected under stones (such as *Lagisca propinqua*, *Polymoë squamata*, *Phyllodoce laminosa*, *Nephtys longisetosa*, *Aonia foliacea*, *Nereis Marioni*, &c.). Certain stations, such as the northern margin of the rock "La Ronde," where *Tethya lynceurium* is abundant, the neighbourhood of the rock "Pic-Triple," the vicinity of La Mothe, and the Sambue, deserve to be particularly indicated. It is near La Mothe that I captured several specimens of a very rare marine Hemipterous insect, *Æpophilus Bonnairei*, which is associated with a beetle, *Æpus Robinii*.

Following the Grève d'Azette comes St. Clement's Bay, the general aspect of which is the same as that of the Grève d'Azette; but the rocks, being more exposed to the winds, are less covered with Algæ, and the pools which are formed at low water are not so numerous as in the former locality. In St. Clement's Bay I have collected nearly all the species which I found on the Grève d'Azette, but at the cost of more laborious researches. On the whole the fauna is rather poor.

The next region, on the contrary, is much richer. It is the triangular space left uncovered at low water, the apex of which is La Rocque, while the base extends from the Conchière to well beyond Seymour Point. The region of which the exploration was especially profitable to me is comprised between La Rocque, Seymour Point, and the tower of the same name, as also between the last and Karamé.

At this point there is, in fact, a thick layer of mud, partly covered with *Zostera*, in which live a certain number of fossorial Crustacea which hollow out burrows in it (*Callianassa*, *Gebia*, and *Axius*), as well as many interesting worms belonging to the genera *Valencia*, *Marphysa*, *Clymene*, *Petaloproctus*, *Phascolosoma*, &c. In those parts which are not muddy the fauna is nearly the same as on the Grève d'Azette; some species, however, appear more abundantly than at other points, such as *Portunus puber* and *P. pusillus*, *Pisa tetraodon*, *Maia squinado*, *Xantho rivulosa*, *Pagurus*, &c. The Echinodermata are represented by numerous specimens of *Ophiothrix fragilis* and a few of *Asterias glacialis* and *Cribrella oculata*; Mr. Sinel has found one or two Holo-

thurians (*Cucumaria*) and once a *Spatangus*, probably thrown up by a gust of wind. At certain points the beach, covered with fine and shelly sands, presents numerous specimens of *Molgulæ* (*Anurella roscovita*). La Rocque is also a very good station for Mollusca (*Pholas dactylus* is sometimes met with there).

From La Rocque to the Pointe de la Coupe the coast offers no point of interest as regards the fauna, which is excessively poor. We have in the first place the immense bay of Grouville, stretching from La Rocque to Gorey, where the sea leaves bare an immense uniform beach, presenting hardly any naked rocks, and containing only a few very common Annelides. The same conditions recur to the north of Gorey in the bays of St. Cathérine and Fliquet.

The whole of the portion of coast included between St. Helier and Gorey is almost exclusively formed of syenite, which, at certain points in St. Clement's Bay, is replaced by diorite. The geological constitution of the rocks changes on leaving Gorey; we meet, in fact, with chocolate-brown petrosiliceous porphyries, which pass into pyromeride. These brown portions are known in Jersey as *rhyolites*. At the same time that the syenite disappears we see the coast gradually rise and present escarpments, which become more and more elevated as we approach the Pointe de la Coupe.

The southern region of the island presents, to the west of St. Helier, two deep bays, the first and most extensive of which is St. Aubin's Bay, and the other, smaller one, separated from the preceding by a promontory which is terminated by the Pointe de Noirmont, is the bay of St. Brelade. To the west of the port of St. Helier, and opposite to its entrance, is Elizabeth Castle, situated upon a rock rather more than half a mile from the town. To the south of the castle are some rocks forming the Hermitage. Between the castle and the port there appear a series of small rocky islets, which are all laid bare at low water and which sometimes give shelter to interesting types. Thus one of these rocks, situated close to the entrance of the port, harbours *Stenorhynchus ægyptius*, a new crustacean for the Channel. The rocks forming the *massif* of the chateau are not very elevated towards the north, that is to say towards St. Helier, but rise higher on the other side, where they plunge perpendicularly into the sea. They are formed, according to M. de Lapparent, of a grauitoid diabase of very beautiful grain, united with a rose-coloured granite, of which it encloses angular fragments.

At the foot of the castle, between the fort and St. Helier,

there are muddy sands in which live numerous Annelides, common enough elsewhere:—*Cirratulus Lamarkii*, *Terebella conchilega*, *Nephtys Hombergii*, *Arenicola piscatorum* and *A. ecaudata*. *Synapte* are very frequent there. At this station I have also collected numerous examples of *Corystes cassive-launus*. The fishermen come to this locality to collect Solens, which are very abundant there.

To the west of the castle there are meadows of *Zostera*, abounding in species of *Mysis* associated with *Themisto brevispinosus*, *Gastrosaccus sanctus*, and other Cumaceæ, *Idotea linearis* and *acuminata*, *Eolis Cuvieri*, *Doris Johnstonii*, *D. tuberculata* and *D. flammula*, *Triopa claviger*, &c. The *Aplysice* are very abundant here in certain years. Towards the south the sands become less muddy, and are replaced by gravels rich in fragments of shells, and in which *Molgulæ* (*Anurella roscovita*) abound. There we also find *Pirimela denticulata*.

The rocks, especially at the Hermitage, are covered with tufts of *Cynthia rustica*, under which live numerous species of crustaceans and worms; we also find here *Ascidia producta*, *Ascidiella scabra*, *Cynthia granulata*, and several species of Sponges (*Leuconia nivea*, *Dictyocylindrus ramosus*, *Hali-chondria incrustans*, *Isodictya cinerea*, &c.).

As to the rest of St. Aubin's Bay, the sea there, in retiring, lays bare an immense uniform sandy beach, possessing no interest for the zoologist, who will only find in it some very common Amelides and *Synapte*.

At the other extremity of the bay, opposite the little town of St. Aubin, some rocks appear, one of which bears an old castle. The Algæ which cover the stones contain some interesting Crustacea:—*Idotea linearis*, *I. acuminata*, and *I. tricuspidata*, *Atylus Swammerdamii*, *Podocerus falcatus*, and *Anonyx Edwardsii*. I have also met with a *Doris Johnstonii*, and some Tunicata (*Ascidia mentula* and *A. producta*, *Ciona intestinalis*, *Amaroucium Nordmanni* and *A. albicans*, *Didemnum sargassicola*, &c.).

Quitting St. Aubin the coast rises and the rocks become rather scarped as far as the Corbières, except in the Bay of St. Brelad. The bottom of this bay slopes very little, but it possesses no interest for the zoologist, as the fauna is null.

The western coast of the island from the Corbières to Cape Gros-Nez is occupied by a long, uniform, sandy beach—the Bay of St. Ouen. All the bottom of this bay is arid and dry, and the collections which I have made there are insignificant.

As to the north coast of Jersey it presents almost throughout its whole length a series of escarpments, and is bounded

by a high rocky perpendicular barrier. It presents a series of little bays in which the sea leaves bare sandy beaches of very small extent. Throughout this coast the fauna is very poor. Upon the rocks, which are too much beaten by the waves, *Balani*, *Patellæ*, and *Littorinæ* can hardly cling, and the sandy beaches shelter only a few very common Annelides.

From this description of the shores of Jersey it will be seen that it is especially and almost exclusively the south and south-east regions of the coast that will be explored with profit by the zoologist. The eastern and western coasts, at low water, only present uniform sandy beaches, the fauna of which is greatly reduced or almost null. As to the northern shores they are not uncovered.

From the St. Aubin Castle to and beyond La Rocque the exposure at low water is very extensive, except at the level of the ridge of the Town Hill, which divides into two regions this immense extent of ground, which is so largely uncovered—one situated to the west of a line passing from the Town Hill to Elizabeth Castle, a not very interesting region on the whole; the other situated on the other side of the above line and containing a varied and rich fauna. This latter region, moreover, throughout its whole extent, presents the same aspect and the same fauna. Except the band of mud which extends before La Rocque in a south-easterly direction, and which contains some peculiar species, all the rest of the Banc de Violet is occupied by numerous rocks of syenite covered by a rich vegetation of Algæ, in the midst of which there are formed at low water a great number of pools, having their bottoms occupied either by gravels or by meadows of *Zostera*. In order to describe the fauna of Jersey, therefore, it is not necessary to establish distinctions between the different regions explored, distinctions which would be founded, if requisite, upon differences of fauna.

#### SPONGES.

I have collected in Jersey a considerable number of species of Sponges; but a certain number of them I have hitherto found it impossible to determine.

Among the Calcareous Sponges it is scarcely necessary to cite *Sycon ciliatum*, Hæck., an extremely common species. *Leucosolenia botrylloides*, Bow., is pretty common among the *Zostera*, and *Grantia compressa*, Flem., is met with occasionally at Elizabeth Castle, where we also find *Dictyoecylindrus ramosus*, Bow., under rocks covered with *Cynthia rustica*. On days of spring-tide fine specimens of *Tethya lynce-*



*rium*, Johnst., may be collected in great abundance at the Grève d'Azette, and some examples of *Caminus osculosus*, Gr., at the Dog-Nest. *Microcionia armata*, Bow., and *Hymeniacion armatura*, Bow., are sometimes met with upon *Pecten*-shells; the former species is more scarce and only lives upon specimens brought up by the dredge. *Halichondria panicea*, Johnst., is a sponge easy to recognize, which covers the rocks with broad green or yellowish expansions. *Hymeniacion celata*, Bow., occurs frequently between the lamellæ of empty oyster-shells. *Hymeniacion caruncula*, Bow., *H. mammeata*, Bow., *Isodictya fucorum*, Bow., *I. parasitica*, Bow., and *I. simulans*, Bow., are all common species at Jersey. *Isodictya cinerea* is much more rare. Another generally distributed sponge forms thin layers, which are difficult to detach, upon the surface of the rocks; it is easily recognizable by its fine rose-colour, and is perhaps identical with *Verongia rosea*, found by Barrois at Saint-Waast. Lastly, I doubtfully refer to *Dysidea fragilis*, Bow., some sponges which live upon certain specimens of *Pisa Gibbsii* and *Inachus dorhynchus*.

#### CÆLENERATA.

There is nothing peculiar in the Actinian fauna of Jersey, and the types met with are the same that are found upon all our coasts. *Anemonia sulcata*, Penn., and *Actinia equina*, Linn., are very generally distributed. At Elizabeth Castle the rocks are covered with *Actinia equina*, all the specimens of which are of a uniform blackish-olive colour. *Tealia crassicornis*, Th., is often associated with the two preceding species, but always subordinate to them in number. *Bunodes gemmacea*, Gosse, occurs in abundance in the little shallow pools of which the bottom is occupied by gravel. In the same stations *Sagartia parasitica*, Couch, occurs attached to the shells in which the hermit-crabs take shelter, and the margins of which always bear a rich garniture of *Hydractinia echinata* and *Sagartia bellis*, Gosse, which is also sometimes met with fixed upon the rocks. We also find, but rather rarely, *Sagartia troglodytes*, Gosse. I once found two specimens of a small white *Actinia* attached to the rocks at Elizabeth Castle, which I have not been able to distinguish from *Sagartia sphyrodeta*, var. *candida* of Gosse. *Edwardsia callimorpha*, Gosse, is tolerably common in slightly muddy gravels, and I have found several specimens of it at Elizabeth Castle.

Lastly, to conclude the enumeration of the Actiniæ of Jersey, I will mention *Adamsia palliata*, Bodd., which never

quits a certain depth, and is common in St. Aubin's Bay, attached to the shells of *Buccinum* in which *Eupagurus Prileauxii* resides.

#### ECHINODERMATA.

This is one of the worst represented divisions at Jersey ; at least the specimens that one can find on the shore are few in number and belong to but slightly varied types. Thus I have never met with a single Echinid, and Mr. Sinel told me he had never met with any, even at the time of the highest tides. But with the dredge, in St. Aubin's Bay, some examples of *Strongylocentrotus lividus*, Brandt, and *Sphaerechinus granularis*, Ag., may be captured. One day, with a high tide, Mr. Sinel found a *Spatangus purpureus*, Müll., at La Rocque. It is to be supposed that this animal was thrown up upon the shore by the waves.

*Ophiothrix fragilis*, Müll., and *Ophiocoma neglecta*, Johnst., are very common. I have obtained in considerable abundance with the dredge, in St. Aubin's Bay, *Ophiura albida*, Forbes, in association with a few specimens of *O. texturata*, Lam.

*Asteriscus verruculatus*, Retz., is very common everywhere ; *Asterias glacialis*, Müll., is much less common on the shore ; but with the dredge one may collect some interesting species in St. Aubin's Bay—*Palmipes membranaceus*, Retz., *Solaster papposus*, Retz., *Asterias rubens*, Linn. I may also cite *Cribrella oculata*, Penn., of which I found several specimens at La Mothe.

The Comatulæ are very rare on the coast, but not altogether wanting ; they may be found at the Dog-Nest and at different parts of the Grève d'Azette.

*Synapte* (*S. inharens*, Düb. & Kor.) are common in the vicinity of Elizabeth Castle. Of the Holothurians I have not met with a single species during my two visits. Mr. Sinel once captured at La Rocque a specimen of *Cucumaria* which has not been determined.

#### VERMES.

I shall consider first the Turbellaria and then the Polychæta.

##### *Turbellaria.*

Of the Planariae the commonest species is *Leptopleura tremellaris*, CErst., which is found adhering to the lower surface of stones, especially on the Grève d'Azette. A very elegant species which is sometimes associated with it, and which is also observed among the *Zostera*, is *Prosthecceræus vittatus*, Lang. *Polyclis lavigatus*, Quatref., is often met with among the

seaweeds. I may cite, further, two species which appear to me to be much morerare, namely *Oligocladus sanguinolentus*, Lang., remarkable for the vivid coloration of the digestive tube, which is strongly coloured red; this I have met with only once at the Grève d'Azette (at the Pic-Triple rock); and *Stylochoplana maculata*, Stimps., of which I have found several specimens behind La Mothe.

Among the Nemerteans I shall mention, first of all, *Lineus longissimus*, Sim., which appears to be very common throughout the south-eastern region of the island, and *Lineus gesse-rensii*, Johnst., a small species of a dark green or nearly black colour. *Valencia splendida*, *V. longirostris*, and *V. ornata*, discovered by Quatrefages at Bréhat and at Chausey, are abundant at La Roque in muddy sand covered with *Zosteræ*, where they live with *Marphysæ*, *Clymenæ*, and fossorial crustaceans.

Of the other species which I have met with at Jersey, and which I have been able to determine with certainty, I may mention:—*Tetrastemma candidum*, Müll., a very abundant species; *Amphiporus lactiflorens*, M'Int., common under stones among seaweeds; and *Polia filum*, Quatref., which no doubt does not differ from *Polia sanguiruba*, Quatref., for I have observed passage-types between these two forms, which, moreover, come very near to each other.

From the Grève d'Azette I have also obtained several examples of *Nemertes gracilis*, Johnst., and lastly some specimens of a bright rose-coloured *Nemertes*, 4 or 5 centim. in length, which I refer, with some doubt, to *Cerebratulus bilineatus*, Ren.

I should also have to record a great number of Rhabdocœlans which live among the seaweeds, associated with Nematodes and small Polychæta; but I have neither the time nor the books necessary for the study of these interesting types, which I am unwillingly compelled to pass over.

### *Polychæta.*

Of the Aphroditina I shall first cite *Aphrodite hystrix*, Aud. & Edw., of which I have dredged several specimens in St. Aubin's Bay. Mr. Sinel showed me some fine specimens of *A. aculeata*, Linn., which he found in the same locality; but for my own part I never met with that species. As to the genus *Polynoë*, it is represented by *P. cirrata*, Müll., a very common species, and by *P. squamata*, Linn., and *Lagisca propinqua*, Malmgr., which are less frequent. To the same family belongs *Sthenelais Edwardsii*, Quatref.

To the Euniceans belong: *Eunice Harassii* and *E. Bellii*,

Aud. & Edw., common species under stones, especially the first-named; and *Marphysa sanguinea*, Aud. & Edw., which is very common in the muddy sands of La Rocque, and also under stones among the rocks of the Dog-Nest and at the Grève d'Azette. It is to be remarked that the specimens coming from the muddy sands break up with the greatest facility either spontaneously or when they are immersed in alcohol, while the specimens from rocky places scarcely ever break up. We may note further *Lysidice ninetta*, Aud. & Edw., and *Lumbriconereis contorta* and *L. humilis*, Quatref.

Among the Nereidians I will mention, first of all, three Nephthydians, namely, *Nephthys Hombergii*, Aud. & Edw., *N. scolopendroides*, Delle Chi., and *N. longisetosa*, CErst. The first species, as is well known, is common on all sandy shores, in company with the *Arenicolæ*. The other two species are rare. The Nereids are represented by numerous specimens of *Nereis cultrifera*, Grube, and *N. Dumerilii*, Aud. & Edw., and a few of *Nereis (Praxithea) irrorata*, Malmgr. Behind La Mothe I have also captured a specimen of *Nereis Marionii*, Aud. & Edw. *Aonia foliacea*, Aud. & Edw., and *Nereilepas lobulatus*, Quatref., may also be mentioned.

In pelagic fishings I have also collected numerous specimens of an Annelide discovered at Dinard by M. de Saint-Joseph, namely, *Leptonereis Vaillanti*, St.-Jos.

The family Syllidia is represented by *Syllis amica*, Quatref., and *S. divaricata*, Kef., *Grubea fusifera*, Quatref., *Claparedia filigera*, Quatref., and other small species which live among the Fuci and Corallines.

Among the Phyllodocians I may mention *Eulalia clavigera*, Aud. & Edw., a common species, with which is sometimes associated *Eteone longa*, Sav. On the Grève d'Azette I have also captured some fine specimens of *Phyllodoce luminosa*, Sav.

The Glycerians are represented by *Glycera capitata*, CErst., and *G. lepidum*, Quatref., both of which are rather rare.

I will cite further *Aricia Cuvieri*, Aud. & Edw., very common in the muddy sand at La Rocque; *Cirratulus Lamarckii*, Aud. & Edw., very frequent; *Siphonostomum uncinatum*, Quatref., also a very abundant species; *Ophelia bicornis*, Sav., which I did not myself find, but of which four specimens were brought to me one day by a fisherman, who told me that he had collected them at La Rocque, without giving me any further particulars; and, finally, *Leucodore ciliata*, Johnst., a species which does not appear to be very common.

Among the Sedentary Annelides it is hardly necessary to

mention *Arenicola piscatorum*, Cuv., which abounds in the sands of the shores, often accompanied by *A. ecaudata*, Johnst.; *Clymene lumbricoides*, Edw., is frequent in the mud of La Rocque, where *Petaloproctus terricola*, Quatref., also lives.

*Chaetopterus Quatrefagesii*, Jourd., is sometimes found under stones; its tube is attached to the under surface of pebbles, and is not bent into a U.

The *Terebellæ* are represented by *Terebella nebulosa*, Mont., which is met with under stones, especially in places where the water runs a little, and by *T. conchilega*, Pall., and *T. prudens*, Cuv.; these last two species, which live in tubes constructed of sand and shell-fragments, are everywhere abundantly distributed.

Among the Sabellians I will cite *Sabella pavonina*, Sav., common in the meadows of *Zostera*; *S. verticillata*, Quatref., which is pretty frequently met with in the midst of tufts of *Cynthia*; and, finally, *S. arenilega*, Quatref. *Protula protensa*, Grube, is found occasionally in the anfractuositities of rocks.

I will also mention *Vermilia conigera* and *V. tricuspis*, Quatref., *Serpula fascicularis*, Lam., *Spirorbis communis*, Flem., generally-distributed species, and, lastly, *Salmacina Dysteri*, Quatref.; in this last species, as is well known, the tubes which protect the individuals become united into voluminous ramified masses, thus forming a sort of polypary, as is also the case in an allied Mediterranean species, *S. edificatrix*. The specimen of *Salmacina* that I possess was given to me by a fisherman, and came from the open sea.

Among the other groups of Vermes I must cite two Gephyrians (*Phascolosoma margaritaceum*, Sars, and *P. elongatum*, Kef.) as pretty common in muddy places.

A few words ought, perhaps, to be said of the Bryozoa; but as I have few remarks to make as to the habitat and stations of the different species, I shall content myself with giving hereafter the list of the species that I have met with.

As regards the Brachiopoda, I will only remark that M. Duprey found on the coast a small species of *Argiope* (*A. capsula*, Jeffr.), under pebbles buried in the beach to a depth of 8 or 10 inches, associated with *Chiton scabriculus*, *Adeorbis subcarinatus*, &c.

## ASCIDIA.

Throughout nearly the whole extent of the Banc de Violet we find attached beneath the stones numerous specimens of *Ciona intestinalis*, Linn., a species abundantly distributed upon all our coasts. Side by side with the type-form, I have met with the two varieties *canina* and *fascicularis*. Associated with these forms we often find *Ascidia mentula*, Müll.; *Ascidiella aspersa* and *A. scabra*, Müll., are also met with on the Grève, but more rarely.

An exceedingly abundant form is *Cynthia rustica*, Müll., which covers the lower surface of certain rocks in company with *Halichondria panicea*. *Ascidia producta*, Hanc., also occurs sometimes adhering to the rocks. The genus *Cynthia* is further represented in Jersey by *C. granulata*, Ald., which is pretty common on the coast, and *C. sulcatula*, Ald., which I have dredged in St. Aubin's Bay.

Another species of Simple Ascidian which I have found in very great abundance at certain stations is the Molgulan rendered famous by the fine memoirs of M. de Lacaze-Duthiers, who has named it *Anurella roscovita*. I have found it in the same stations as those indicated by the learned Professor of the Sorbonne, that is to say, upon the beaches covered with fine sand, never completely uncovered at low water, at Elizabeth Castle and at La Rocque. *Anurella roscovita* is widely distributed upon these shores; its tunic is covered, as usual, with sand-grains and fragments of shell. The shell-fragments covering my specimens from Elizabeth Castle have been determined by M. Duprey, and belong to the following species:—*Rissoa labiosa*, *R. striata*, *R. parva*; *Cerithium reticulatum*; *Trochus striatus*, *T. cinerarius*, *T. umbilicatus*; *Littorina obtusata*; *Dentalium tarentinum*; *Astarte triangularis*; *Phasianella pulla*; *Purpura lapillus*; *Nassa reticulata*.

I also collected several specimens of a small *Molgula* attached to certain Algæ adherent to the rocks, which I refer to *Molgula socialis*, Ald. (young form), and some examples of *Ctenicella Lanceplaini*, Lac. *Polycarpa glomerata*, Ald., is pretty frequent upon the stems of *Laminariæ*, but appears always to have been thrown up by the sea.

The Social Ascidia are represented by numerous specimens of *Clavelina lepadiformis*, Wiegman, attached to the lower surfaces of rocks, and some of *Perophora Listeri*, Müll., very common on seaweeds.

The Compound Ascidia are exceedingly abundant; they are, however, of forms common on the French shores of the

Channel; and, in this respect, the fauna of Jersey presents a great analogy with that of Roscoff, investigated by Giard. I will cite, in the first place, *Aplidium zostericola*, Giard, very common on the *Zostera*; and the *Amaroucia*, some species of which (*A. Nordmanni*, *A. proliferum*, and *A. albicans*, Edw.) are very abundant. The *Amaroucia* are frequently associated with *Fragarium elegans* and *Morchellium argus*, described by Giard.

*Didemnum* is represented by a very common species forming small corms of variable colour, generally tending to bright yellow or grey, which may be referred to *D. sargassicola*, Giard. The genus *Leptoclinum* is very generally distributed; it includes, in the first place, *L. maculosum*, Edw., forming very extensive violet-coloured corms which are found at the base of the stems of *Laminaria*. Associated with this, and exceedingly common, is *L. asperum*, Edw.; *L. durum*, Edw., and *L. fulgidum*, Edw., form greatly developed sheets, which cover the rocks; *L. gelatinosum*, Edw., lives in similar situations.

A new *Diplosoma* is abundant at Jersey; I have found it especially upon the *Laminaria*. M. Lahille, who had also observed it at Roscoff, has described it under the name of *D. Kœhleri*.

The Botryllidæ are represented by *Botrylloides rotifera* and *B. rubrum*, Edw., and by numerous *Botrylli*. Besides some types, which by their coloration cannot be referred to any species described by Giard, I have met with: *B. Schlosseri*, Sav., generally the variety *adonis*, Giard, *B. pruinosis*, Giard, *B. smaragdus*, Edw., *B. violaceus*, Edw. (numerous varieties), *B. aurolineatus*, Giard, *B. morio*, Giard, and *B. rubigo*, Giard; the last two species are not so frequent as the others.

[To be continued.]

## MISCELLANEOUS.

*Freshwater Sponges from Newfoundland: a new Species.*

By EDWARD POTTS.

THE author stated that in the latter part of August 1885, Mr. A. H. MacKay, of Pictou, Nova Scotia, whose success as a collector of freshwater sponges in his own neighbourhood has been already recorded (Proc. Acad. Nat. Sci. Philad. 1884, p. 215, &c.), made a scientific visit to the island of Newfoundland. His explorations